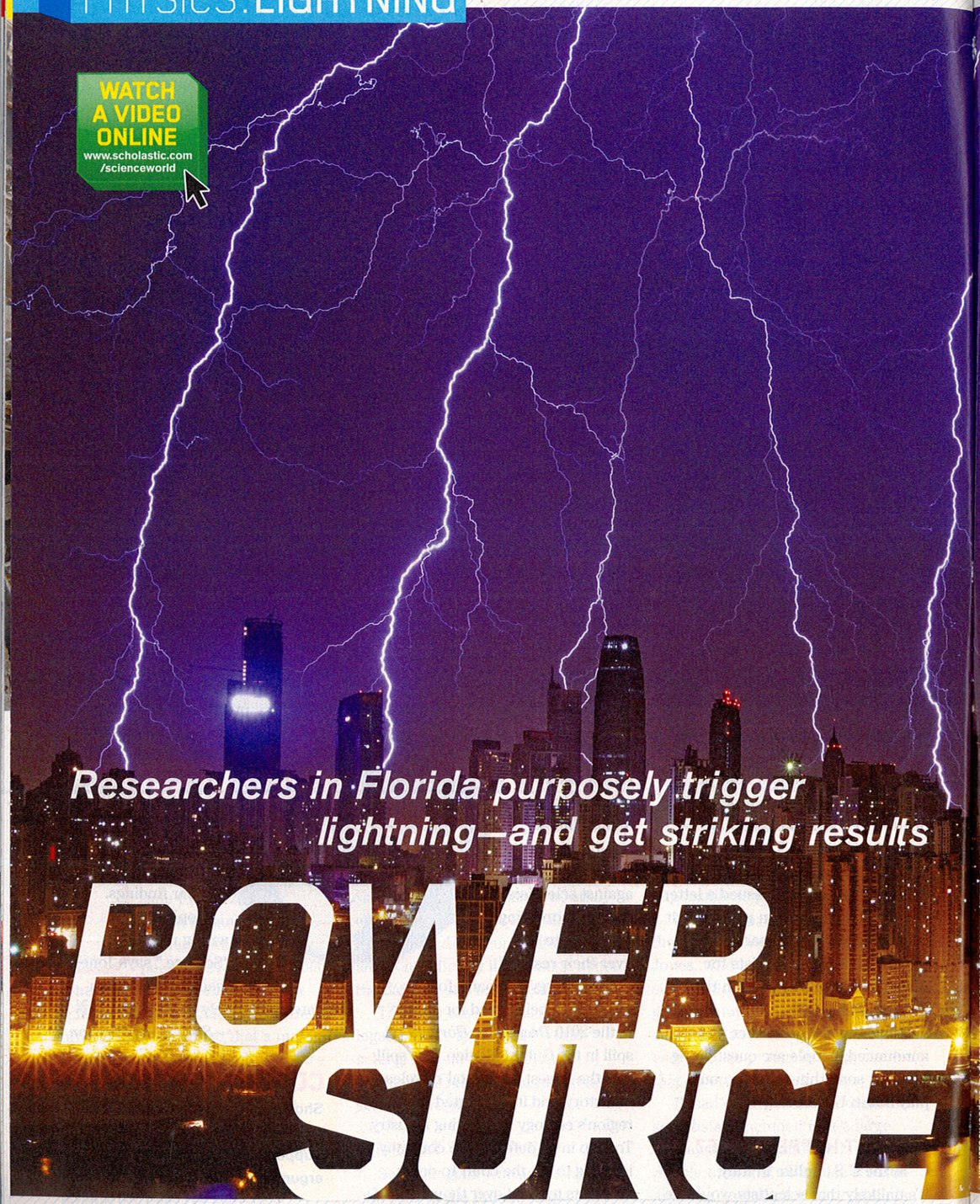

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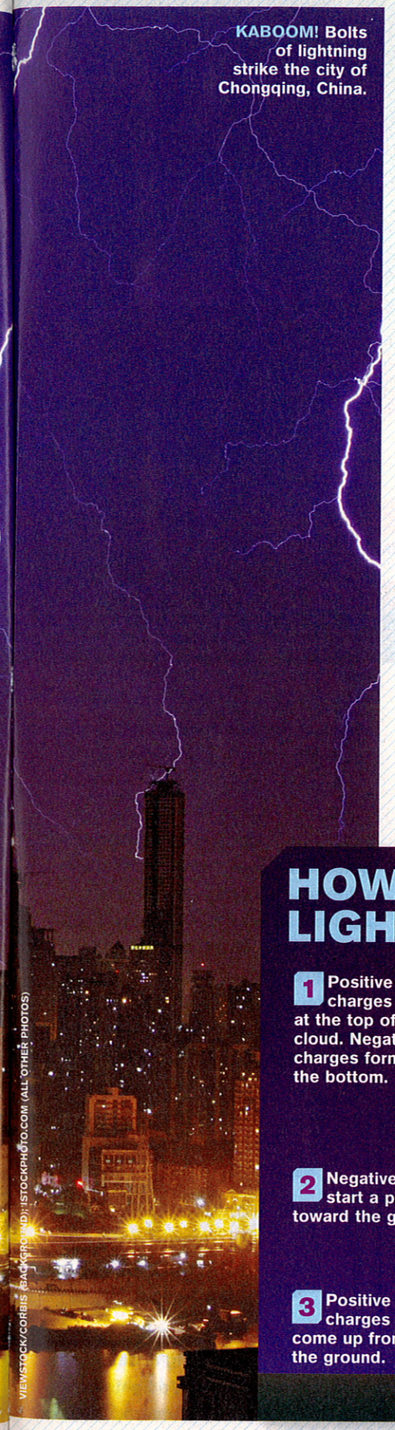
Researchers in Florida purposely trigger lightning—and get striking results

POWER SURGE



KABOOM! Bolts of lightning strike the city of Chongqing, China.

VIEWSTOCK/CORBIS (BACKGROUND); ISTOCKPHOTO.COM (ALL OTHER PHOTOS)

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The countdown begins: "Five, four, three, two, one, fire!" The rocket shoots into the air with a thin wire trailing behind it. Lightning strikes and a booming explosion shakes the ground. The researchers cheer. Mission accomplished!

Every year in the U.S., lightning kills dozens of people, injures hundreds more, and causes billions of dollars in damage. Scientists still don't understand exactly how lightning starts, how it travels long distances, or what determines where it will strike. So while most people want to avoid lightning, researchers at the University of Florida use rockets to trigger it. They hope that by doing so, they can unlock lightning's mysteries.

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Before this spark can form, electrical charges have to build up in a thunderstorm cloud. Something similar happens when you rub your feet on a carpet: your body picks up *electrons*, or negatively charged particles. Opposite charges attract, so when you reach for a metal doorknob—which has a positive charge—the charges jump across the gap to meet in a spark, and you feel a jolt of static electricity. "[Lightning] is the same basic process, on a much more

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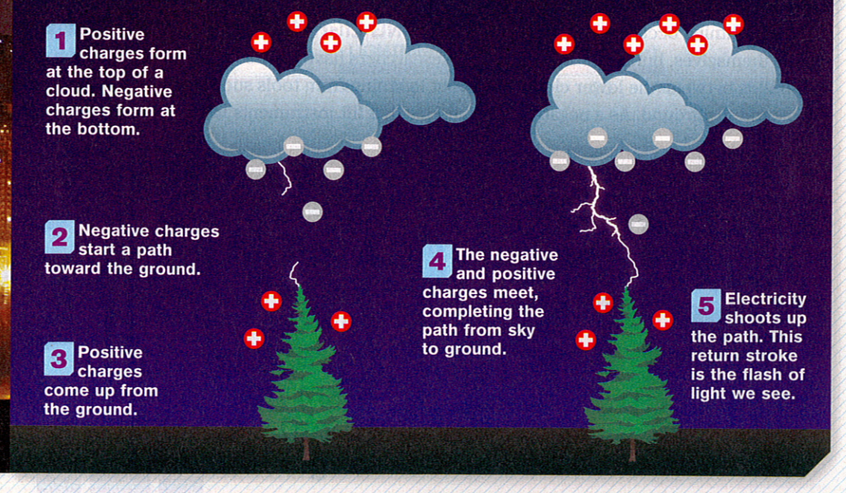
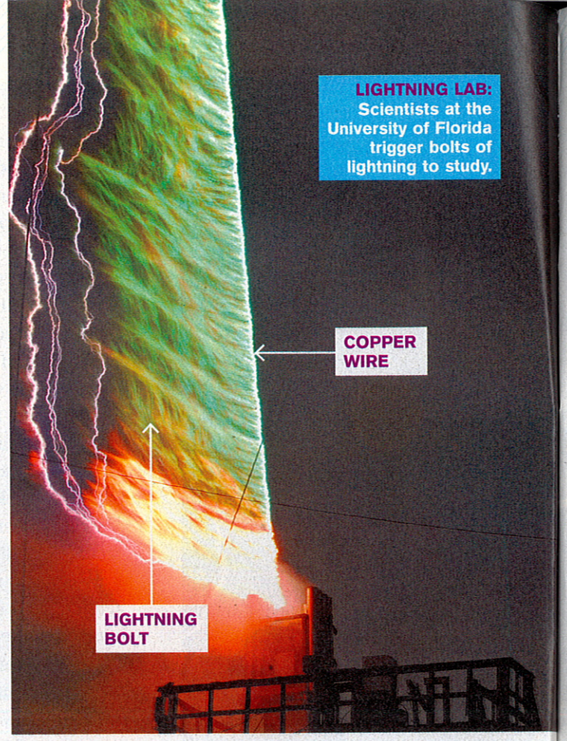


STRIKING PATTERN: When people are struck by lightning, they develop a branching sear on their skin.



LIGHTNING LAB: Scientists at the University of Florida trigger bolts of lightning to study.

COPPER WIRE

LIGHTNING BOLT

COURTESY OF DR. DOMART (LEFT); COURTESY OF ICLRT, UNIVERSITY OF FLORIDA (RIGHT)

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Most lightning occurs within the clouds themselves, but attraction also builds between the lower cloud region and the ground. As a negative charge reaches downward from the cloud, positively-charged particles reach upward from the ground, often traveling through a tall tree or building (*see How Cloud-to-Ground Lightning Forms, p. 15*). The two meet in a stroke of lightning that can heat the surrounding air to 30,000°C (54,000°F). That's about five times hotter than the sun's surface.

STUDYING LIGHTNING

Researchers have learned a lot about lightning from tools such as balloons that lift instruments into thunderstorms and *light-mapping arrays*—a series of stations that pick up lightning's *electromagnetic* signals in the form of radio waves to map the time and location of flashes. But, says Martin Uman, an electrical engineer at the University of Florida, "Lightning is difficult to study because you never know when or where it's going to happen."

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SHOCKING STRATEGY

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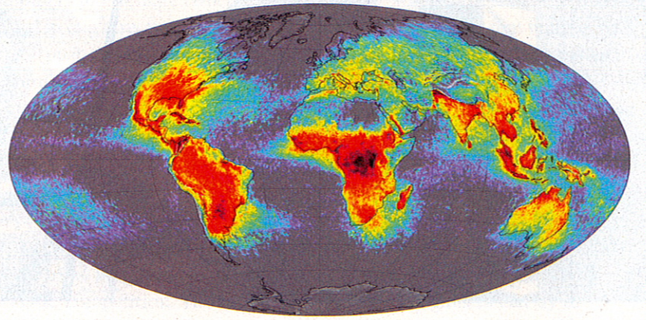

LIGHTNING FLASHES (per km²/year)
0.1 0.4 1.4 5 20 70

NASA (TOP); ISTOCKPHOTO.COM (BOTTOM)

SHOCKING LIGHTNING FACTS

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A bolt of lightning can be more than 8 km (5 mi) long.

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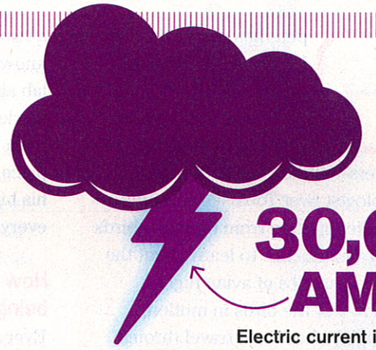

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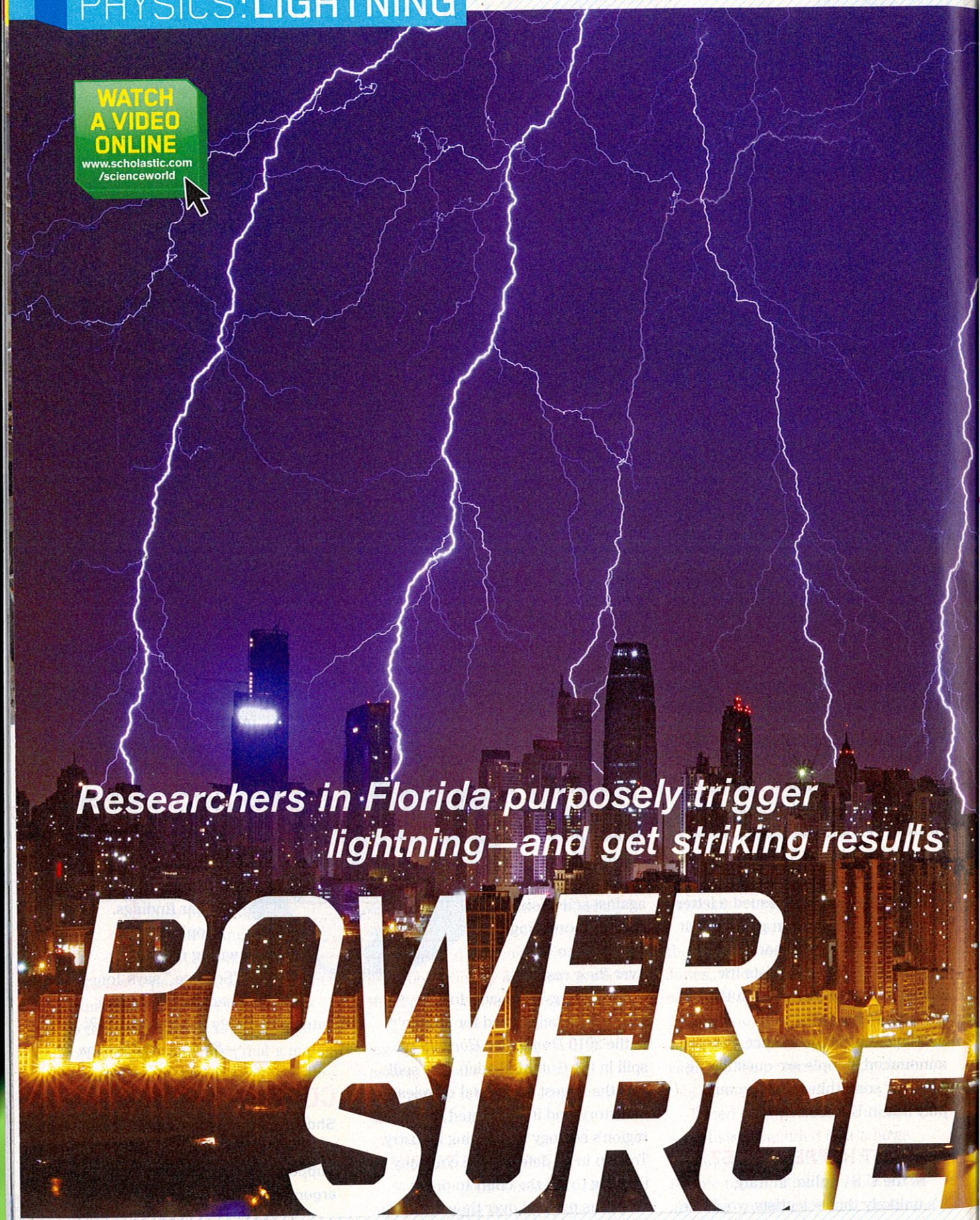

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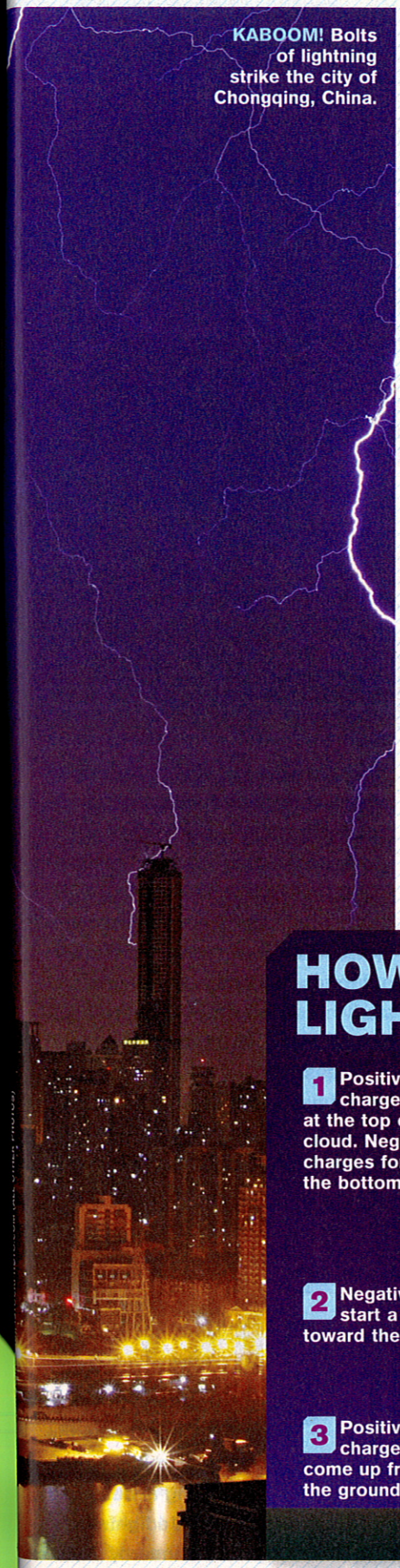

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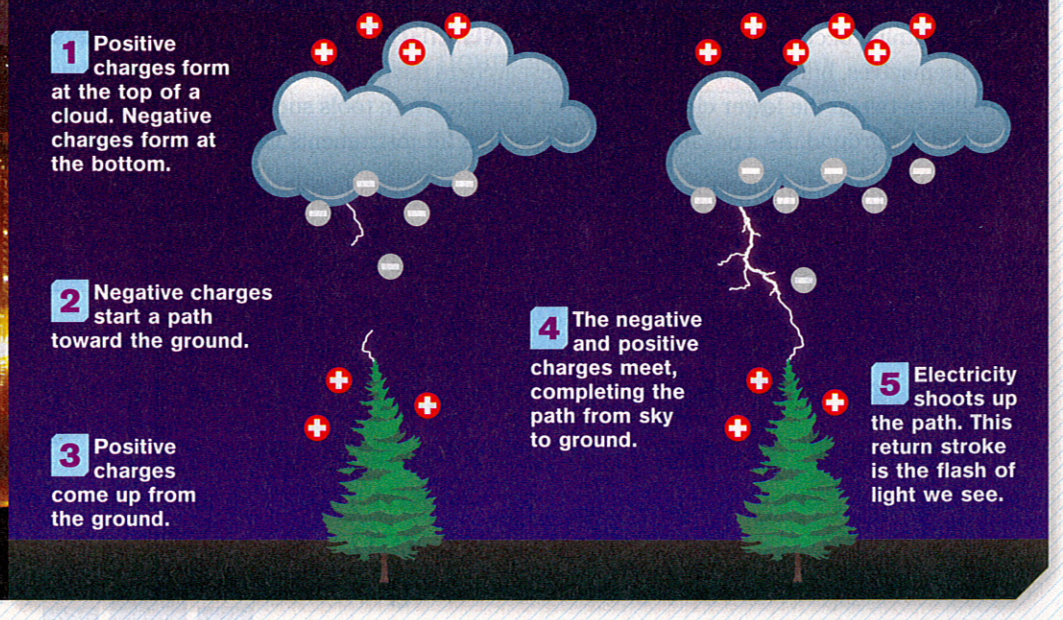

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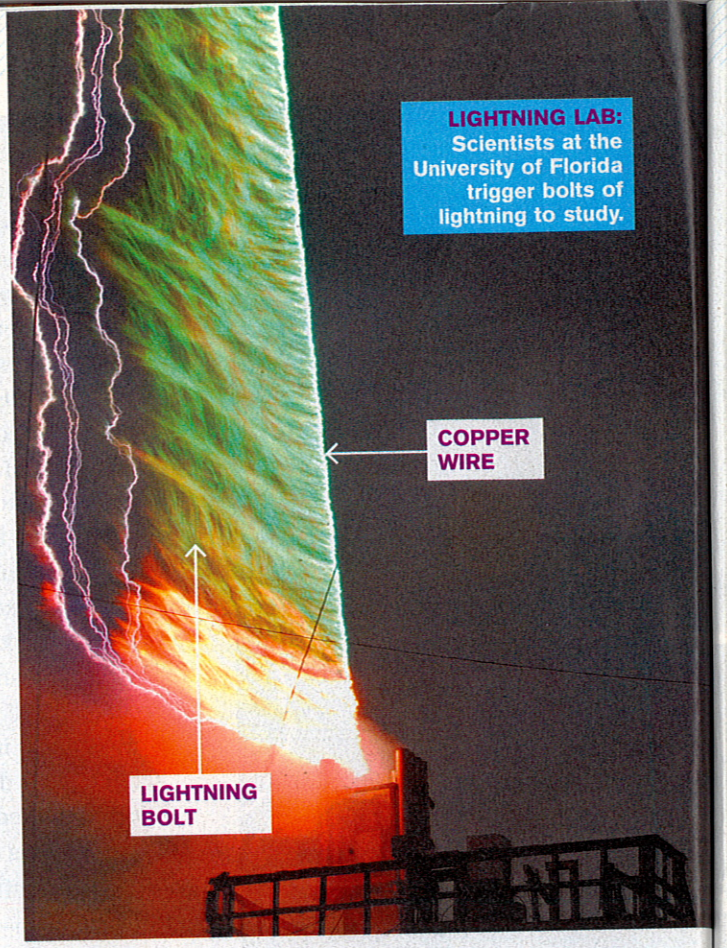

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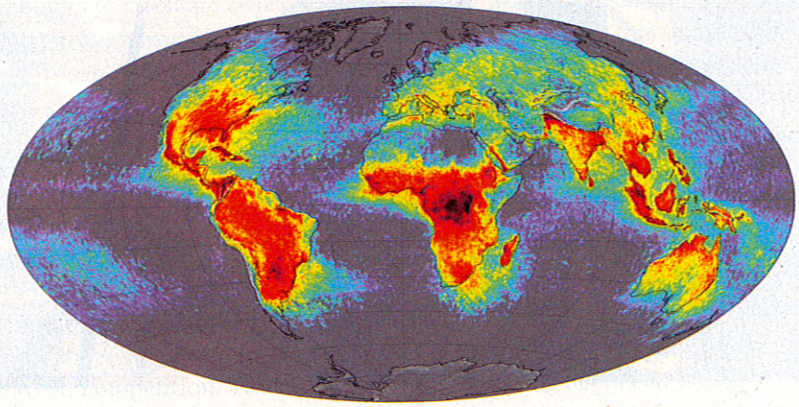

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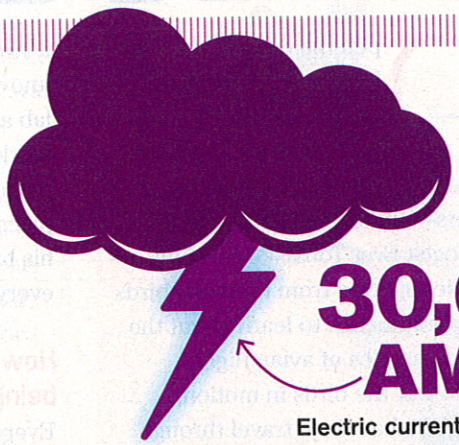

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